

### Calculations

- 1.) 1 acre foot of soil is 1800 tons.

$$\text{Top 3 inches of an acre foot} = (1/4) \times 1800 = 450 \text{ tons}$$

- 2.) Manure is spread at 3.6 tons per acre

$$\text{Percentage of manure in soil} = 3.6/450(100) = 0.8\%$$

- 3.) 5 tons of soil is lost per year (per acre foot of soil).

$$0.8\% \times (5 \text{ tons} \times 2000 \text{ lbs}) = 80 \text{ lbs of manure lost each year}$$

- 4.) At 2,210 ppm total concentration, chemicals are added to the 264,000 gallons of manure each day.

$$2,210/10^6 \times 264,000 \text{ gallons} \times 8.34 \text{ lbs/gallon} = 4,865.89 \text{ lbs of chemical additives are added to the manure each day}$$

- 5.) LWR produce 220,176 lbs of solids per day;

$$\text{Concentration of chemicals in the manure} = 4,865.89 \text{ lbs} / 220,176 \text{ lbs} \times 10^6 = 22,100 \text{ ppm}$$

- 6.) In a 25 year storm over 24 hours, 0.375 acre feet of rain is generated as runoff

$$1 \text{ acre foot of H}_2\text{O} = 325,851 \text{ gallons}$$

$$\text{Lbs of H}_2\text{O runoff per storm day} = 325,851 \times 0.375 \times 8.34 \text{ lbs/gallon} = 1,019,100 \text{ lbs}$$

- 7.) 22,100 ppm of chemicals in 80 lbs of manure lost each year =  $(22,100 \times 80 \text{ lbs}) / 10^6 = 1.768 \text{ lbs}$  of chemical lost each year

- 8.) Concentration of chemical additives in runoff = 1.768 lbs of polymer lost per year / 1,019,100 lbs of runoff per 25 year storm day

$$= \underline{\underline{1.73 \text{ ppm of polymer in the 25 year storm runoff per acre foot of soil.}}}$$